Welcome to the Senquip quarterly update. If you would like to be added to the distribution list, please send us a mail at support@senquip.com.

Introducing the Senquip QUAD

The Senquip QUAD is a result of customer requests for a device with external antennas to allow for more install locations. The Senquip QUAD features external GPS and 4G antennas, more capable IO, dual CAN, and a DIN rail or wall mount capability.

The Senquip QUAD does not replace the Senquip ORB which is designed for extreme environments where IP ratings are essential and external antennas are likely to be damaged. Senquip ORBs are typically mounted up poles, on walls, and externally on machines.

The Senquip QUAD is designed for harsh environments where there may not be a clear view of the sky and external antennas are a benefit. Senquip QUADs are typically found in electrical enclosures, in operator cabs, and mounted on machines.

Samples are available now with general availability in June 2023.

What is Different on the Senquip QUAD

The Senquip QUAD offers external antennas, DIN rail mount, a second CAN bus interface, an internally settable voltage source and enhanced IO.

All 5 IO blocks can now perform frequency, duty cycle, pulse count, 4-20mA sink and source, switch to power, switch to ground, switch to internally generated voltage, or enable a pullup. All measurements can be performed simultaneously and with the IO in any output state.

You can now, for instance switch an output to Vin to enable an external device and then measure the voltage on the output and the current that is flowing to confirm the health of the device.

## Day Night Controller Implemented as a Script

Day night sensors are used to automatically control the operation of lighting, solar, greenhouses and more. The output from a light sensor is compared with a setpoint to make the day night decision. Unfortunately, the sensitivity of the light sensor changes as it gets dirty and they are prone to triggering by shadows and stray light sources.

Another way to detect day and night is with an algorithm that uses position and time to calculate sunrise and sunset. Senquip devices are equipped with GPS and can run JavaScript locally and so can perform day night control on connected systems without a light sensor.

The maths behind the algorithm is complex and is a good demonstration of the capabilities of the Senquip scripting language. Senquip has written the algorithm that is available as an application note.

What Can You Monitor on a Lighting Plant
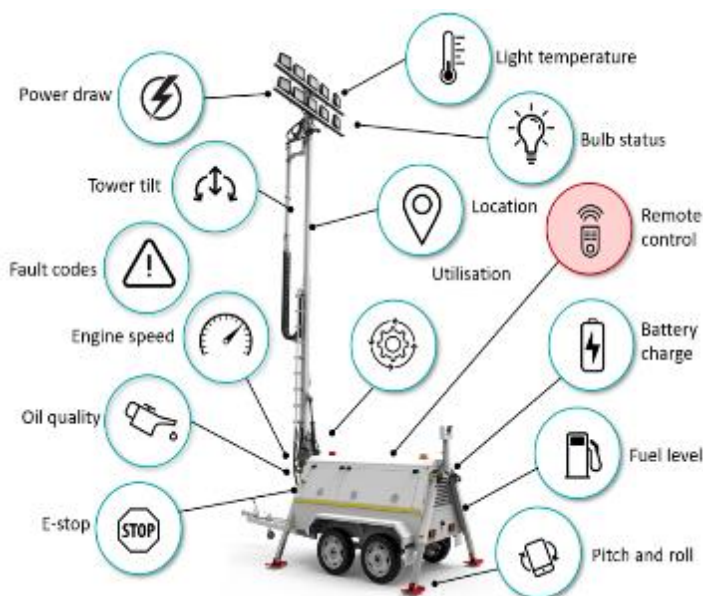
Senquip devices monitor lots of lighting plants. The most commonly monitored parameters are position, fuel level, utilisation, engine hours, and battery state of charge. There is however a whole lot more that your Senquip device can do.

Some customers have implemented remote start and stop from their preferred dashboard. One has taken it further and is using the day night algorithm discussed above to automatically turn the plant off and on.

Another easy win is the monitoring of machine pitch and roll using the built-in angle sensor. Besides knowing that the lighting tower is upright, running on flat ground ensures good oil coverage in the engine.

Being towed whilst running, oil condition, bulb condition, E-stop monitoring; there is a lot more a single Senquip device can measure. Challenge Senquip and our distributors with your monitoring idea!

Interesting sensors: TE Oil Quality Sensor

The OPS3 from TE is an Oil Property Sensor that directly and simultaneously measures the dynamic viscosity, density, dielectric constant, resistance (Rp) and temperature of oils.

Relying on patented tuning fork technology, the sensor monitors multiple physical properties that enables the system to determine the quality, condition and contaminant loading of fluids such as engine oil, transmission, hydraulic and gear oils.

Applications include on and off highway vehicles, compressors, industrial equipment, and turbines.

Decrease total cost of ownership by extending oil change intervals, diminishing machine downtime, and reducing oil waste. Mitigate risk of failure by sensing unexpected oil degradation.

Testing Oil Quality Sensors

Oil Condition Monitoring (OCM) is a crucial element of any predictive maintenance schedule. OCM includes measuring, monitoring, and analysing changes in lubricant and fuel oils for contamination and chemical content, and tracking degradation in oil quality from new to end-of-life.

Senquip has noted the interest in OCM and the potential for the technology to be transformative in the industrial and mining sector. Senquip has also however noted that the claims made by OEM sensor manufacturers have not always matched the end user experience in the field.

Senquip is working with Macquarrie Corporation and Westrac to independently test Tan Delta, TE, Poseidon, and Oil Advantage sensors in lab and field environments.

Application Note 21 describes Tan Delta and TE sensor ability to detect water, coolant, diesel, and iron contamination of oil.

Subscribe to Topics

Senquip devices can now subscribe to arbitrary MQTT topics, allowing devices to receive data directly from a user server. Users can now remotely update settings, trigger events, and send data to Senquip devices from their own servers – no contracts, no ongoing costs.

Senquip devices have always been able to securely send data via UDP, HTTP, and MQTT directly to a customer server. This update, available on SFW002 firmware devices, extends that functionality so that remote devices can now securely receive data and action that data from within a user written script.

Scripting Updates

Struggling to work out why your script is crashing? You can now enable feedback from the script on why it terminated by enabling the *Send Errors* option below the scripting window.

You can now lock scripts to prevent inadvertent changes being made, and to protect your IP. Use the Lock button at the bottom of the scripting window to protect your script.

The following new functions have been added to the scripting language:

- **SQ.to_fixed()** - convert a number into a string with the given precision.
- **SQ.copy()** - copy a string into a memory location based on a pointer.
- **GPS.get_data()** – returns an object containing the latest internal GPS data.
- A BLE device name filter has been added to BLE scan results to reduce memory usage.
- **MQTT.sub()** - allow MQTT subscriptions to private endpoints.
- **MQTT.set_lwt()** - configure the Last Will and Testament (LWT) message.
- **SQ.lte_last_rssi()** – read the last LTE RSSI from within a script.
- Increase the max script size to 20000 bytes.
- Increase number of persistent (NVS) variables to 50.
- **Timer.parse()** - function to convert a date string to a UNIX timestamp.
- **Add Timer.tzo()** - function to get the time zone offset (LTE connection required).
- Combine all MODBUS read errors into a single alert to save data.
- Add new root certificate for Azure.

For more information on new features and the scripting language, see the Device Firmware Changelist and the Scripting Guide.

IPU Machinery Reliability and Resilience Forum

Senquip is pleased to be presenting at the IPU Machinery Reliability and Resilience Forum in West Bromwich, England on the 25th of April 2023.

Norman Ballard from Senquip will be presenting a series of real-world applications to highlight the financial opportunity that remote monitoring and control offers all machine owners.

Stuart Morgan from Enovation Controls will be presenting his vast experience of J1939/Stage V engine integration, and CAN protocol integration beyond the engine.

Jay Pinn from IPU will provide a technology integration workshop session on getting the most out of your equipment, from understanding the machines language, optimising control and connectivity through to integration with IoT devices.

To register, please complete the online registration.